DOCUMENT RESUME

ED 116 401 EC 080 793

AUTHOR Silver, Rawley A.
TITLE Using Art to Evaluate and Develop Cognitive Skills: Children with Communication Disorders and Children with Learning Disabilities.
PUB DATE 75
NOTE 27p.; Paper presented at the American Art Therapy Association (6th, Louisville, Kentucky, November 13, 1975)

EDRS PRICE MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS *Art; *Cognitive Development; Elementary Secondary Education; Exceptional Child Research; *Learning Disabilities; *Mentally Handicapped
IDENTIFIERS *Communication Disorders

ABSTRACT

Described are two studies which used art therapy to improve cognitive and language abilities in a total of 45 children with learning difficulties or communication disorders. The art procedures focused on the development of three types of concepts: the concept of a class or group of objects, concepts of space, and concepts of sequential order. A case history is provided of a 13-year-old S of the first study, a boy with language impairments, severe hearing loss, and an IQ of 43, who showed significant improvement on nine cognitive skills after nine art lessons. In the second study using 11 children with learning disabilities the children improved significantly in the three focal areas of cognitive development. Also included are a sample teacher evaluation form, a summary of results of the second study, a summary of responses by 14 parents of children in the second study, and teaching suggestions. (DB)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

USING ART TO EVALUATE AND DEVELOP COGNITIVE SKILLS

Children with Communication Disorders and Children with Learning Disabilities

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

Rawley A. Silver, EdD, ATR

Graduate School, Department of Art
College of New Rochelle
New Rochelle, N.Y. 10801

American Art Therapy Association, Sixth Annual Convention, Louisville, Kentucky, November 13, 1975.

© Rawley A. Silver, Rye, N.Y. 1975

"PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY
Rawley A. Silver
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER."

ED116401
EC080793

This paper is concerned with art procedures found useful in understanding and treating problems in cognition. The procedures were initially developed in a project for children with communication disorders[1] and later used in a study of children with learning disabilities. In both studies, children improved significantly in cognitive areas as measured by tests developed in the studies and tests adapted from experiments by Jean Piaget, Jerome Bruner, or their associates. Although these investigators were concerned with normal rather than handicapped children, and verbal rather than nonverbal communication, their observations about stages of cognitive development can be applied not only to what a child says but also to what he draws.

What I plan to do here is describe the procedures, illustrating them with drawings by one of the children, a boy who will be called Burt, then summarize results. But first a word about the assumptions underlying the studies and the questions that were asked.

Rationale

The first assumption is that thought can be separated from language. There is considerable evidence that language and thought develop independently, and even though language facilitates thought, high level thinking can and does proceed without it.[2]

In addition, language disorders are associated with damage to the left hemisphere of the brain while visual-motor disorders are associated with damage to the right hemisphere of the brain.

---

[1]State Urban Education Project #147232101, Cognitive Skills Development through Art Experiences, Rawley A. Silver, 1973.

[2]Piaget, 1970, Elkind, Furth, Arnheim, Sinclair-de-Zwart.

The left seems specialized not only for language but also for analytical and sequential thinking while the right seems specialized not only for visual-motor skills but also for intuitive, simultaneous, and spatial thinking. The left is associated with concepts and intellect, science and mathematics, logic and history. The right is associated with art and metaphor, poetry and music, drama and dance.

Although left hemisphere thinking is usually valued more highly, art therapists, among others, know the power of nonverbal thinking and the importance of nonverbal communication in all our lives. The theme of this convention, "Concepts and Intuition: Friends or Foes", may suggest that we ought to choose between them, but I would like to add a word of caution. Concepts and intuition, left and right hemisphere thinking, seem to be two modes of consciousness, as Robert Ornstein has pointed out, and we need them both.

A second assumption, in the studies, is that concepts and intuition can be friends rather than foes, at least with brain damaged children. The children who participated had disorders which seemed to be associated with either one hemisphere of the brain or the other. In the initial project, they had language and hearing impairments. In the second study, they had the opposite constellation of strengths and weaknesses - verbal strengths and visual-motor weaknesses. In both studies, many had emotional problems as well.

One reason for this assumption is that new information and learned patterns are relayed widely throughout the brain, according to the neurologist, Richard L. Masland:

> Large areas of the brain called association areas do not have direct connection with incoming sensory channels, but serve as integrating centers to which information may be relayed from several primary sources... I don't think it is too much to postulate that every experience that we have, and all of the training and conditioning which occur throughout the lifetime, result in the establishment of activation patterns through which our sensations are interpreted and related to associated information and to the appropriate related response (p. 94)

If so, it may be that art experience can serve to establish activation patterns for language to follow, or reinforce patterns set by language; and even though a child's capacity for language may be severely impaired, his capacity for symbolizing may be intact.

The art procedures were attempts to develop three areas of cognition that are said to be basic in mathematics as well as important in everyday life. The areas are first, the concept of a class or group of objects; second, concepts of space; and third, concepts of sequential order (Piaget, 1970, p.24). These concepts are usually developed through language and associated with analytical thinking.

The concept of a class or group of objects requires the ability to make appropriate selections, associate them with past experiences, and combine them into a context such as a sentence. Although selecting and combining have been identified as the two fundamental operations underlying verbal behavior (Jakobson, p. 25), they seem no less fundamental in the nonverbal thinking that underlies the visual arts. The painter, for example, selects and combines colors, lines, and shapes; and if his work is representational, he selects and combines his subject matter as well.

Furthermore, art symbols, like language symbols, can stand for either a class of objects or particular individuals. The drawing or painting of a man can represent the painter's father, or authority figures in general, or man in the abstract, or all three; just as the word "man" can represent each or all of these ideas, depending on the verbal context.

The other two concepts under consideration - concepts of space and of order seem so obviously related to the visual arts that they need no elaboration here.

The question asked in the initial project was whether an experimental group of 34 children with language and hearing impairments could acquire these concepts through art experiences. Various procedures were devised to help the children discover the concepts themselves, and to guide their teachers in evaluating the level of thinking behind the drawings they produced.

Burt

Burt, age 13, had many handicaps - receptive and expressive language impairments as well as severe hearing loss of 75 dB in his better ear. His IQ was estimated at 43 (Stanford Binet).[1]

Before the art program began, his classroom teacher evaluated his abilities and disabilities using a rating scale of 1 to 5 points (Table I). She gave him the lowest score, "almost never" for ability to select named objects or combine words

[1] when Burt was 7, several IQ tests were administered: Vineland, MA 4.4, SQ 59; Merrill Palmer , MA 4.2 PQ 56; Stanford Binet, IQ 40, MA 3.1.

into sentences. She also gave him the lowest score for ability to group objects on the basis of class, or associate new information with what he knows. She repeated the evaluation when the art program ended three months later, and again after six months at the end of the school year. His average score in these categories improved from 1 point to 3.2 points out of a possible 5. This was, of course, a subjective evaluation, and it is not claimed that art experience alone could take the credit for his gains, but they are mentioned because they seem to parallel his gains as measured by the project's prepost tests, as will be reported shortly.

Burt was present at 9 of the 11 art periods. In the first period, the children were shown an arrangement of four toy animals, asked to select the same animals from a pile, and arrange them in the same way on their own sheets of paper. Burt selected 3 of the 4 animals, placed only 2 correctly in relation to one another, and placed none correctly in relation to the edges of his paper. This task was adapted from an experiment by Piaget and Inhelder, and Burt's response corresponded to their Stage II, typical of children younger than 7 who have not yet developed the ability to relate objects according to a system of reference (p. 428).

After this brief task, the children were free to draw or paint whatever they liked. Burt drew a faceless man with a knife in his stomach (Fig. 1), then stopped. I asked if he would like to give the man a face. He said no, then asked me how to draw a face. I started to demonstrate on the blackboard but this was not what he wanted. He asked me to draw his own likeness

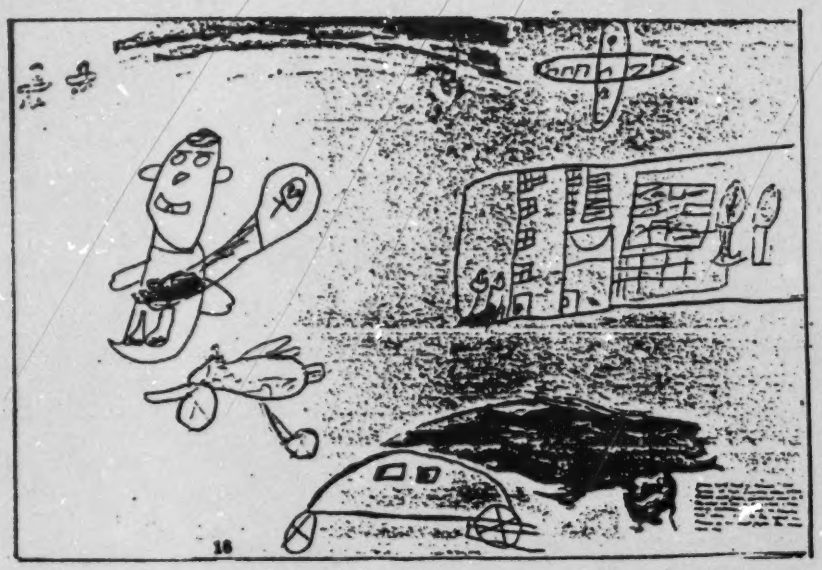


Fig. 1

which I did. Burt then added the face to his drawing and proceeded with the house and car. When the period ended, he was so engrossed in drawing that his classroom teacher offered to let him stay on.

In the second art period, the children were shown a variety of drawings on 3x5" cards, spread out on two tables. On one table, the drawings represented people and large animals. On the other table, they represented objects and small animals. The children were asked to chose one or two cards from each table then draw pictures about them. They were also asked not to copy the model drawings but to draw the subjects they had chosen in their own individual ways.

Burt chose a boy from one table and a knife from the other but did not draw them. Instead, he drew airplanes dropping bombs on ships, buildings, and so forth (Fig. 2). He connected bombers and targets with scribbled or dotted lines, accompanying each strike with sound effects.

---

[1]This was one of the tasks developed in the project and is described in detail in the January, 1975 issue of American Journal of Art Therapy.

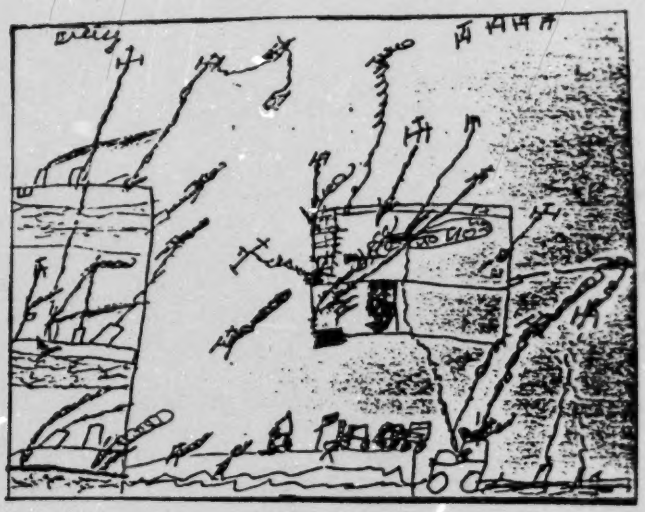


Fig. 2

There is a difference between his two drawings in the way he related his subjects. Although both are fragmentary with a jumble of points of view, the subjects in his first drawing are related in the most elementary way, through proximity and distance. The man, for example, is larger than the car and the house. In his second drawing, his subjects are related with conventional symbols - dotted lines and scribbles, perhaps intended to be smoke.

In the third period, the children were introduced to painting with palettes, palette knives, brushes, and poster paint. The mixing of red and yellow into orange was demonstrated, black added to make brown, white added to make tan. Then the children chose colors for themselves and experimented with mixing their own. Burt worked hard, but his hands trembled and his attempts to retrieve drops of color with the palette knife usually made matters worse. His frustration is reflected in the slashing strokes and scrubbing in a nonrepresentational painting (Figure 3).

Fig 3

Clay was introduced in the fourth period which started with a technique devised by Sonstroem to help normal children learn to conserve (Bruner, p. 208). The technique calls for two balls of clay of equal size, rolling one ball into a "hotdog" and back again into a ball. After each alternation, the children were asked to judge the amount of clay and explain their answers. The combination of labeling and manipulating enabled 8 of 10 normal children to recognize that appearance is not reality, that the amount of clay does not change with the change in shape.

Although language could play only a minimal role with Burt, he apparently learned to conserve. He was one of 11 children in the experimental group who were unable to conserve on the pretest. In the post-test, some months

later, 4 of these children were able to conserve amounts of liquid, and Burt was among them. Some studies have found normal adults unable to conserve when presented with the same task.

Burt went on to model the clay and made a box with a slit on top - a bank. He was so delighted with it that he couldn't wait a week to let it dry, and brought it back to his classroom with him.

In the fifth art period, the model cards were again presented. Burt chose the sketch of a nurse showing only her head and shoulders. In his painting, he drew the nurse full-length combined with an object of his own invention - crutches (Fig.4) This painting is organized in both form and content. There is no fragmentation. The forms relate to the paper as though its edges served as frames of reference, and the functional relationship between nurse and crutches suggests that Burt had a story in mind.

Fig. 4

With time to spare, he painted Figure 5 , using black paint and a few touches of red and blue. He began to talk about his painting, when he had finished, and I wrote his words on the blackboard. He copied them, spontaneously, on his painting, "No cars, no people, rain all over, can't walk, get a boat, swim."

Fig 5

The sixth art period was similar to the first, placing objects in given positions. Burt showed decided improvement over his performance in the first period, scoring 16 points out of a possible 18. He then painted a non-representational design in flat color planes and dotted line. His hand no longer trembled, as it did in the third period, and there was no suggestion of frustration in the painting or in his classroom behavior.

The next three periods were spent drawing from observation and the last two periods were free for spontaneous drawing, painting, or modeling clay.

Burt's progress in drawing from observation is evident in Figure 6. The task was to draw an arrangement of three cylinders and a toy bug. In his first attempt, he missed the front=back relationships (a); in his second, he related the cylinders correctly but omitted the bug (b). In his third attempt, he was asked to change places with a classmate on the opposite side of the arrangement and the reversal apprently confused him. His left-right relationships are wrong and two cylinders appear <u>above</u> the table (c). These drawings suggest that Burt had reached Piaget's Stage II, typical of normal children ages 4 to 7.

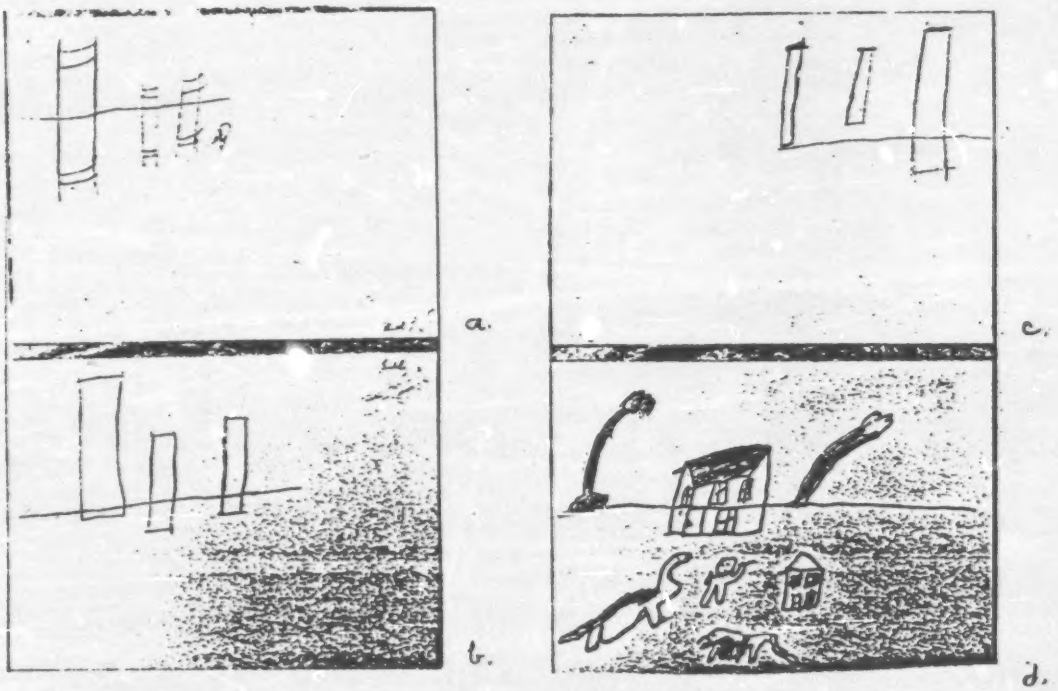


Fig. 6

Burt's last drawing, however, the landscape (d) is an accurate representation of the 7 toy objects presented to the children only one week later. Distances and proportions are correct as well as the left-right and front-back relationships between the objects. His only mistake was in drawing the two trees above the base plane. Since Burt's earlier mistakes had not been pointed out to him, his gains reflect his own corrections and observations.

This drawing suggests that he was at Stage III, typical of children age 9 to 11, or possibly Stage IV, typical of children his own chronological age, but there was no way to tell. Piaget's experiments had depended on verbal exchanges and abstract terms. Since verbal exchange with Burt was limited, Piaget's experiment with diagrammatic layouts could not be carried out (1967, p. 432).

In the ninth art period, the children were asked to draw the way water would look in the outline of bottles in various positions, and the way a house would look on the outline of a steep mountain slope. Next, they were invited to test out their predictions with bottles half-filled with water, plumblines, and so forth. And finally, they were asked to paint pictures of people fishing with mountains nearby. It was hoped that art experience, following immediately, would provide opportunities to reflect on the new information and relate it to associated information during the process of painting imaginary pictures.

Burt's score on the pretest was 2 points out of a possible 5 in horizontal orientation, and 4 points in vertical orientation.[1]

---

[1] scoring form and directions for scoring are shown in Table VII.

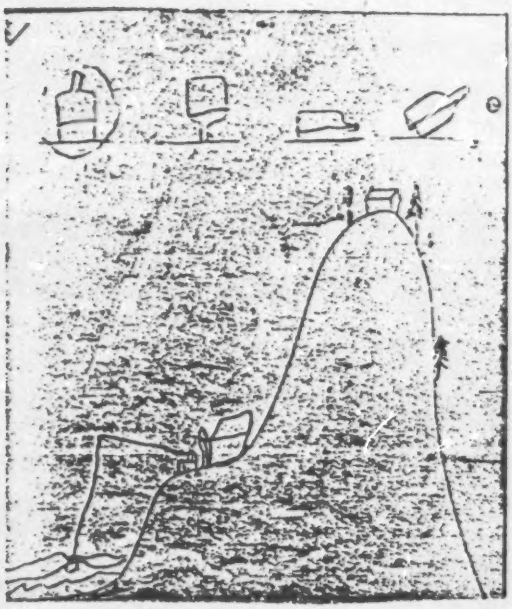


Fig 7

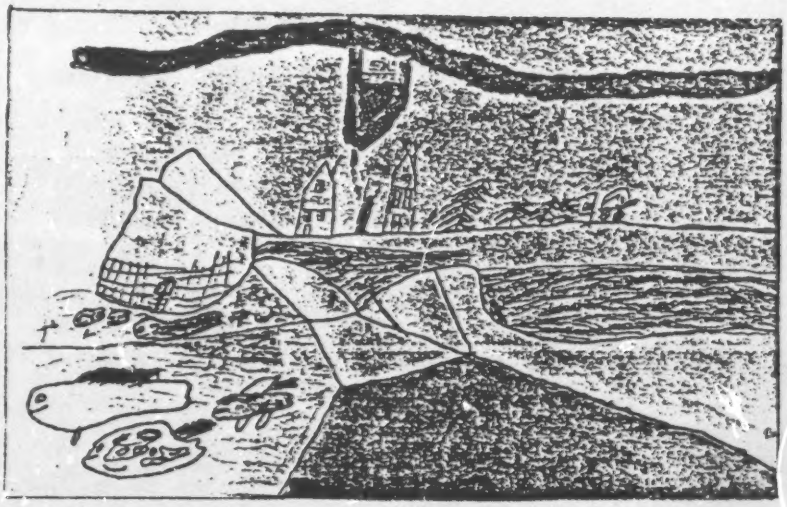


Fig 8

Burt explained his painting from imagination (Fig. 8) as follows: The house suspended above the landscape will not fall down. The baby fish is eating its mother. The red lines on her body are his bites. A boy sitting on the dock is watching. Another boy (behind the crosshatching) is in jail. They can't fish because the sign says no. Between them is a fish graveyard.

The various denials in this fantasy suggest that Burt had been pondering about gravity, imposing one's will versus following directions, and so forth. He seems to have made use of art experience to obtain vicariously what cannot be obtained in reality and to express indirectly some angry feelings.

On the posttest, he received the highest score, 5 points in both horizontal and vertical orientation. Since studies have found college students who have not learned that water remains horizontal regardless of the tilt of its container,[1] Burt seems to have done very well on his own.

[1]Hoben, Thomas, et al, "Observation is Insufficient for Discovering that the Surface of Still Water is Invariantly Horizontal, Science, v. 181, 1973, p. 173.

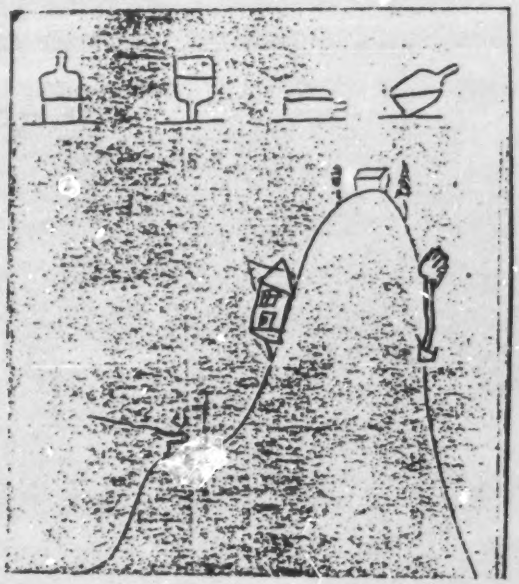


Fig. 9

There were fourteen pre-post tests in the project. Burt's score on the pretests totaled 36 points; on the posttests, 66 points out of a possible 70. His mean score on the pretest was 2.57; on the posttest, 4.17 out of a possible 5 points, as indicated in Table II.

Table II: Burt's Performance on Project Tests

Cognitive Skills	PRE-TEST October	POST-TEST January	CHANGES
1. Conserving Liquid	0	5	+5
2. Conserving Solids	0	5	+5
3. Conserving Numbers	5	5	0
4. Ordering a Series	5	5	0
5. Ordering a Matrix	3	5	+2
6. Ordering Colors	1	5	+4
7. Placing Objects in Given Positions	3	5	+2
8. Horizontal Orientation	3	55	+2
9. Vertical Orientation	5	5	0
10. Grouping 3 objects	3	3	0
11. Grouping from an array	5	3	-2
12. Selecting	1	5	+4
13. Combining	1	5	+4
14. Representing	1	5	+4
mean	2.57	4.71	2.17

Initial Project and Results

There were 18 children in Burt's experimental group. Eighteen other children, who did not attend the art classes, served as controls. They were a randomly selected 50% sample of all pupils in three classes in a school for children with language and hearing impairments. On the posttest, the difference between the groups in favor of the experimental group was found to be highly significant, at the $p<.001$ level, as measured by the 14 key items.[1]

The most promising teaching and testing procedures were subsequently used in the second study.

Second Study

The second study was concerned with two questions: would the procedures be useful with children who had learning disabilities rather than language and hearing impairments? and could the procedures be used effectively by art therapists or teachers other than the one who developed them?

Eleven graduate students, in the Master's degree program in Therapeutic Techniques in Art Education at the College of New Rochelle, worked under supervision with eleven children. The children were not selected but were enrolled as their applications were received following newspaper announcements[2] that art classes were being offered to children with learning problems or other disabilities.

---

[1] Statistical analyses were performed by John Kleinhans, PhD, Manhattanville College, Purchase, NY. They are available in the project report(ED #084745) as indicated in References.

[2] mailings were also sent to members of the Westchester Association for Children with Learning Disabilities

The classes were held on Saturday mornings, the children attending 10 one-hour periods. The graduate students attended 3 preliminary lectures, then each week for half an hour before the children arrived, reviewed teaching plans. They stayed on for another half hour after the children left to discuss the results. The first and last art periods were devoted to pretesting and posttesting while each intervening period was devoted to one of the tasks.[1]

When the art program ended, six of the students scored the prepost test drawings, and the results were analyzed[2] for reliability and for changes in cognitive development. In addition, after the program ended, a questionnaire was mailed to parents of the participating children, asking for anonymous opinions of the program.

The findings indicate that the children improved significantly in the three areas of cognitive development that were the focus of the study, as measured by the project tests (Tables III, V,VI,VII). Comparing scores of the 11 children before and after the art program, improvement was found at the $p<.01$ level in ability to select and combine, at the $p<.05$ level in spatial orientation, and at the $p<.01$ level in ability to order a matrix.

---

[1]Statistical evaluation in the second study was limited to 11 children although 15 children and 15 teachers had participated in the program. Two were eliminated because they could perform the pretests (1 was deaf, the other emotionally disturbed). The third child withdrew from the program and the teacher of the fourth child became ill and dropped out of the course.

[2]Statistical analyses were performed by Claire Lavin, PhD, Chairman of the Department of Special Education at the College of New Rochelle. Her analyses are available on request.

To illustrate, Figure 10 is the first drawing from imagination by Mario, age 7, a child with the extreme distractibility and overactivity of children with hyperkinesis. This pretest drawing received an average score of 1.08 for ability to associate or form groups. as scored by the six judges who rated the drawings on the basis of 1 to 5 points with 1 being the lowest score.

Figure 11 is Mario's last drawing from imagination which he explained as his mother and himself watching a puppet show on a stage. This posttest drawing received the score of 3.41, the largest gain.

His pretest drawing from observation was so poor that it was scored zero by each judge, again the lowest score. His posttest drawing received an average score of 1.66, higher than two other children. (Figures 12 and 13)

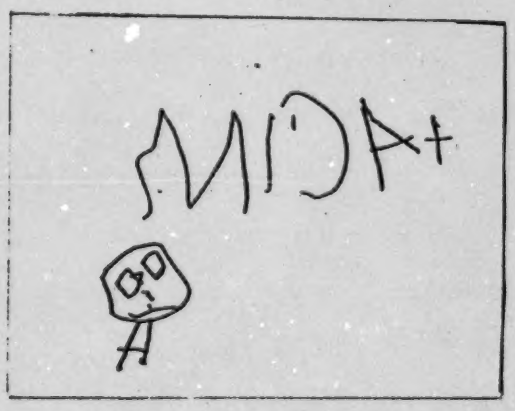


Fig. 10

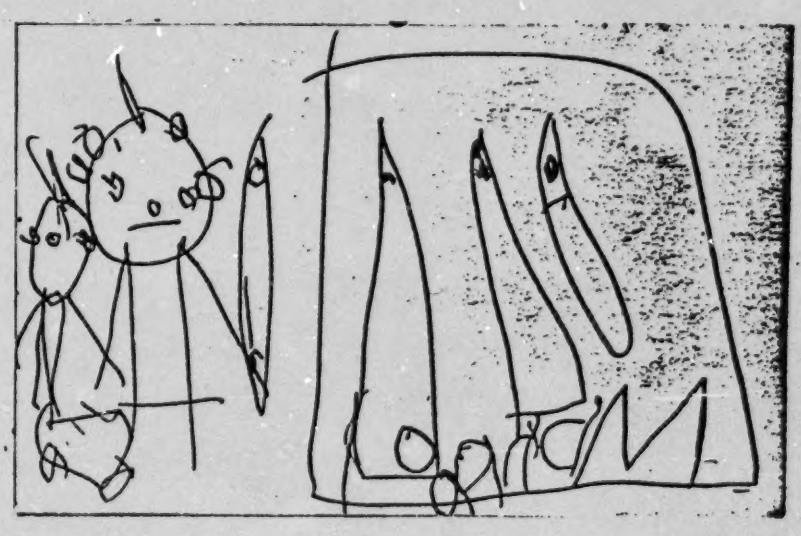


Fig. 11

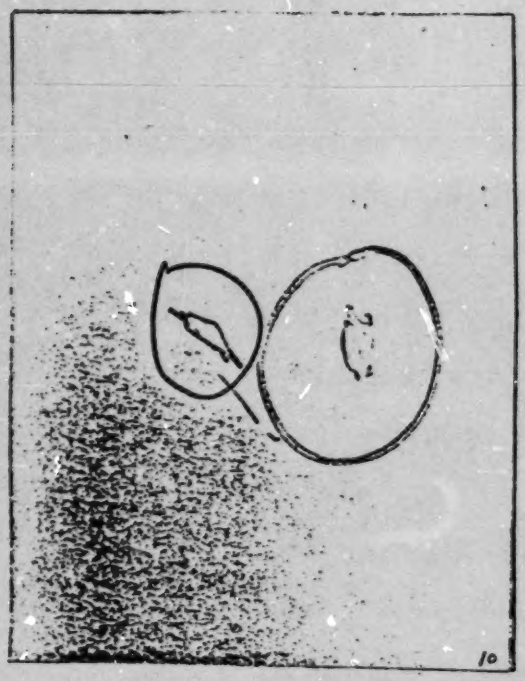


Fig. 12

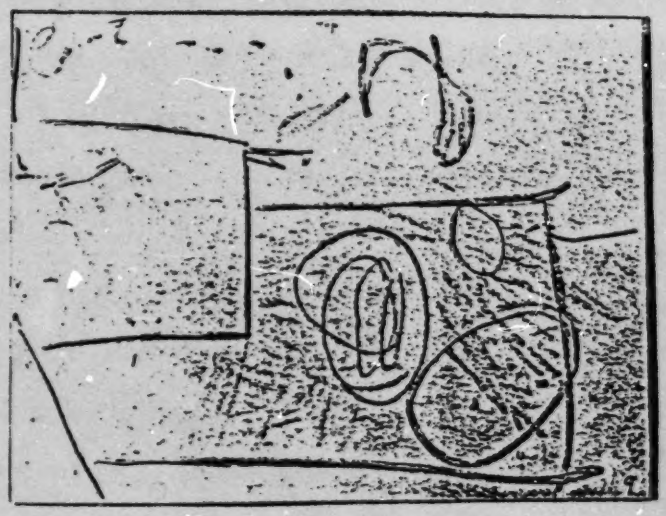


Fig. 13

The judges did not know they were his drawings, ofcourse. Each of the 44 prepost test drawings was identified only by number, and all were presented in random order at the same time. Mario's teacher-therapist was Maryann Balint.

The reliability of the judges ratings of the test results was based on the scores of eleven tests. The obtained reliability coefficient was .852 for ability to associate or form groups, and .944 for spatial orientation, indicating that the six judges , based upon their training, had similar frames of reference and displayed a high degree of agreement in scoring the tests.

The questionnaires were returned by fourteen parents. Twelve checked the highest rating (very much) in response to the question, "did your child enjoy coming to the class," and 13 indicated that they would like to be informed about future classes, as indicated in Table IV.

The findings seem to suggest that the art procedures developed in the two studies can be used to evaluate and develop cognitive skills of children with communication disorders and children with learning disabilities. They also suggest that the procedures can be used effectively by art therapists and art teachers.

References

Arnheim, Rudolf, Visual Thinking, University of California Press, 1969.

Bruner, Jerome S., et al, Studies in Cognitive Growth, Wiley, 1966.

Elkind, David, et al, Studies in Cognitive Development, Oxford, 1969.

Ornstein, Robert E., The Psychology of Consciousness, Viking, 1974.

Sinclair-de=Zwart, Hermina,"Developmental Psycholinguistics", Studies in Cognitive Growth, op. cit.

Jakobson, Roman, "Linguistic Typology of Aphasic Impairments", Disorders of Language, AVS deReuck and Maeve O'Connor, eds., Little Brown and Co., Boston, 1964.

Masland, Richard L., MD, "Brain Mechanisms Underlying the Language Function", Human Communication and its Disorders, Natl Institutes of Health, Public Health Service, U.S. Dept. of Health, Education amd Welfare, 1969.

Piaget, Jean, Genetic Epistemology, Columbia University Press, 1970.

Piaget, Jean and Barbel Inhelder, The Child's Conception of Space, WW Norton and Co., New York 1967.

Sonstroem, Anne MacKinnon, "On the Conservation of Solids", Studies in Cognitive Growth , ed. Jerome S Bruner, op cit

Silver, Rawley A., Cognitive Skills Development Through Art Experiences, State Urban Education Project Report, Project No, 147232101, New York, 1973. Available through ERIC, ED No. 084745.

Silver, Rawley A., "Children with Communication Disorders: Cognitive and Artistic Development", American Journal of Art Therapy, Jan. 1975, Vol. 14, No, 2.

Winer, B.J., Statistical Principles in Experimental Design, N.Y. McGraw Hill, 1962.

Table I: Teacher Evaluation of Burt's Abilities Before and After the Art Program

Rated on the basis of 1 to 5 points: 1 = almost never, 2 = on rare occasions, 3 = sometimes, 4 = fairly often, 5 = very often.

	OCTOBER	JANUARY	JUNE	CHANGE
IS (S)HE ABLE TO:				
1. Select named objects	1	4	4	+3
2. Comprehend words and phrases	4	4	4	0
3. Follow instructions	4	4	4	0
4. Find the right word	4	1	2	-2
5. Use nouns, synonyms, antonyms	2	1	3	+1
6. Combine words into sentences	1	1	3	+2
7. Use connective words, pronouns, adjectives, adverbs	3	1	2	-1
8. Sequence events, tell stories	4	3	3	-1
9. Explain his thoughts or ideas	4	2	3	-1
10. Discuss hypothetical questions	2	2	1	-1
IN NON-VERBAL ACTIVITIES, DOES (S)HE:				
11. Detect similarities between objects	3	3	3	0
12. Group objects on the basis of invisible attributes, such as class or function	1	2	2	+1
13. Put objects in sequence such as size or weight	3	3	3	0
14. Recognize that appearances may be deceiving (knows that spreading out a row of pebbles does not increase the number, for example)	1	3	2	+1
15. Associate new information with what he knows, incorporate and make use of it	1	4	3	+2
16. Concentrate for more than 5 minutes	3	3	4	+1
17. Retain information and carry a task through to completion	3	1	2	-1
18. Solve problems	1	1	2	+1
19. Engage in imaginary play	5	4	2	-3
20. Originate ideas or forms	1	2	2	+1
DOES (S)HE TEND TO:				
21. Work independently without asking for help or direction	1	1	3	+2
22. Control emotions (does not cry easily or hit, shove, fight)	2	1	4	+2
23. Tolerate frustration	4	2	3	-1
24. Join readily in group activities	4	5	4	0
25. Cooperate with adults	4	5	4	0
26. Cooperate with other children	3	3	3	0
27. Be interested in learning language	4	2	3	-1
28. Be interested in learning generally	4	2	3	-1
29. Have a sense of humor	5	2	2	-3
30. Have self-confidence, self-esteem	3	2	3	0

Table III: Results of Art Program for Children with Learning Disabilities Taught by Graduate Students at CNR, Fall, 1974

Child	age	sex	ABILITY TO FORM GROUPS Pre	Post	Change	SPATIAL ORIENTATION Pre	Post	Change
Da	7	F	1.16	2,66	+1.50	2.16	2.16	0
Ro	11½	M	1.50	3.33	+1.83	2.91	7.33	+4.42
Do	9	M	1.00	2.50	+1.50	0.91	5.00	+4.09
Ra	9	M	1.16	1.83	+0.67	2.08	1.25	-0.83
Ca	11	M	1.66	1.16	-0.50	0.75	1.58	+0.83
Mario	7	M	1.08	3.41	+2.33	0.00	1.66	+1.66
Ma	7¼	F	2.91	2.41	- .50	4.50	2.16	-2.34
Ca	7	F	1.83	1.16	- .67	0.83	2.58	+1.75
Va	11½	F	2.75	3.50	+ .75	3.66	5.16	+1.50
Pa	8½	M	2.58	2.83	+ .25	3.58	2.50	-1.08
To	8	M	3.00	2.00	-1.00	2.16	2.58	+ .40

The children improved significantly in the three areas of cognitive development. In ability to form groups or associate, the obtained t value (4.79) was significant at the .01 level. In spatial orientation, the obtained t value (2.42) was significant at the .05 level. In ordering, the obtained t value was 6.54, significant at the .01 level.

The obtained reliability coefficient was .944 for spatial orientation and .852 for ability to form groups indicating the judges displayed a high degree of agreement in scoring the tests. Reliability was determined using the formula analysis of variance to estimate reliability of measurements as described by Winer (1962) page 128.

Table IV: Questionnaire and Responses by Fourteen Parents of Children Participating in the Second Study

Dear Parent:

Now that our experimental art class is coming to an end, we would like to know if it was worthwhile for the children who participated, It would be most helpful in planning future classes, if you would answer the following questions with checkmarks in the appropriate boxes.

1. Was the art class beneficial for your child in:

	not at all	very little	some-times	much	very much
visual-motor development			///	/	//
cognitive "			///	/	//
artistic "		/	//	/	///
emotional "			//	/	////
social "	/		/	///	//
other _____					/

2. Did your child enjoy coming to the class?

yes	no
//// //// ///	/

3. Would you like to be informed about future classes?

There are no plans for continuing the class next term. Arrangements made directly with student teachers, for continuing, would not be under the auspices of the College of New Rochelle, and accordingly, the College would have no responsibility for supervision..

Table V: ABILITY TO ASSOCIATE AND REPRESENT (FORM GROUPS)

Materials: paper 8½x11, black felt-tipped pen, and Set A (drawings on 3x5" cards

Procedure: Present the cards in a random arrangement so that all are visible at the same time. For individuals, spread out on a table; for groups, prop against a wall. Ask subject(s) to draw a picture about one or more of the people or objects on the cards, the story-telling kind of picture, something happening, adding whatever is needed to make the drawing more interesting. Also, ask them not to copy the cards. "They are just here to help you get started. Draw in your own way. When you have finished, please turn your paper over and write your name and a title for your drawing".

Score each drawing on the basis of 1,3, and 5 points, as indicated below. Score 2 or 4, if needed, to indicate an intermediate level.

THIS DRAWING SUGGESTS THAT THE CHILD HAS ABILITY TO

A. Select at the level of
   1. ___Perception (subjects are not related but simply denoted, may be isolated or unrelated in size; no interaction)
   3. ___Function (subjects are related concretely - what they do or what can be done to them)
   5. ___Connotation (subjects are related abstractly -goes beyond denoted meaning, implies more than is visible; suggestive, indirect, possible rather than actual events)

B. Combine at the level of
   1. ___Proximity, distance, enclosure (subjects float in space, drawing is fragmentary, uncoordinated)
   3. ___Base line (bottom of paper may serve as base line)
   5. ___A unified whole (attention given to whole paper, or background and subjects shown from a single point of view)

C Represent at the level of
   1. ___Imitation (copied model or used stereotype such as stick figures; impersonal)
   3. ___Reconstruction(changed model or stereotype, or used pictographs -arrows, dotted lines, cartoon devices)
   5. ___Transformation (highly personal, inventive, imaginative)

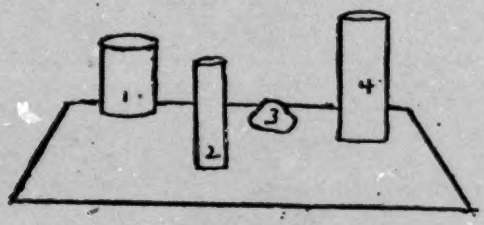
D. Express verbally at the level of
   1. ___Description (title simply describes what is visible)
   3. ___Amplification (title elaborates on what is visible)
   5. ___Transformation (symbolic or abstract, presents thoughts or feelings not evident without verbal explanation)

E. Express nonverbally through visual art medium, at the level of
   1. ___Commonplace form
   3. ___Moderate skill, care, exploration
   5. ___Skill or sensitivity to art values

© RAWLEI & SILVER 1975 RYE, N.Y.

Table VI: ABILITY TO PERCEIVE AND REPRESENT

Materials: paper 8½x11", black pen, and Set B (3 cylinders differing in height, width, and color; a large pebble, and a cardboard base on which their outlines are traced in the positions shown below)



front view

Place the arrangement as shown against a wall so that the back of the base plane touches the wall, and ask subject (s) to sketch it from observation. To clarify the task, sketch the arrangement yourself very quickly, no more than 20 seconds, then put your sketch out of sight.

Score drawings on the basis of 0,1,3,and 5 points as indicated on the scoring form below.

Scoring Form

name age diagnosis date

A. Left-right relationships (horizontality, width)
1. ___ only 2 adjoining objects are correctly placed
3. ___ 3 adjoining objects , or 2 pairs, are correctly placed
5. ___all adjoining objects are correctly placed

B. Above-below relationships (verticality, height)
1. ___the relative height of any 2 objects are correct
3. ___the relative height of 3 objects are correct
5. ___the relative height of all objects are correct

C. Front-back relationships (perspective, depth)
1. ___base plane is represented by a line enclosing the objects
3. ___base plane is represented by a base line or bottom of paper
5. ___base plane is represented as a plane supporting objects which appear as seen from a single point of view. (score zero if base plane is not represented)

© RAWLEY A. SILVER 1975 RYE, N.Y.

Table VII: ABILITY TO ORDER SEQUENTIALLY AND TO CONSERVE

Materials: Sets C, D, and E, and Form A; black felt-tipped pen.

A. Ordering a Series (based on task by Piaget, 1970, p. 29) Set C

Present the series of sticks in a pile and ask child to put them in order from shortest to longest.( ).

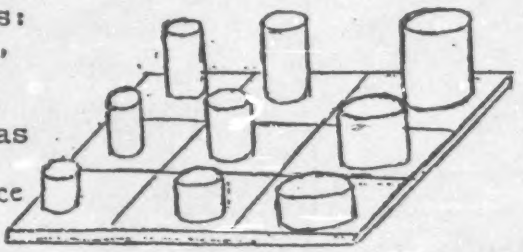
1.___Places 3 or more correctly but does not form a single series
3.___Forms a single series through trial and error
5.___Forms a single series using a systematic approach

B. Ordering a Matrix (based on technique by Bruner and Kenny, p.156)

Present Set D arranged as follows: Remove first 1 cylinder, then 2, then 3, and ask child to replace them.

Next, scramble the cylinders and ask him to build "something like what was there before".

Scramble the cylinders, then place the one that was in the southwest corner (shortest, thinnest) in the southeast corner. Ask him to build it again, leaving the cylinder where you placed it.



1.___Can replace cylinder
3.___Can reproduce matrix
5.___Can transpose matrix

C. Conserving a Quantity (based on task by Piaget and Inhelder, and cited by Bruner, p. 184) Set E.

Present the 2 bottles of equal size and ask child to give them the same amount of lentils. When he says they are the same, ask him to pour the contents of 1 bottle into the 3rd (larger) bottle. Ask. "is there still the same amount here as here (pointing) or is there more here, or here?"

0.___Says the amounts are different
5.___Says the amounts are the same

D. Horizontal orientation (based on tasks by Piaget and Inhelder, p.379)

Present form A. Ask child to complete the outlines of the bottles by drawing the way water would look in them.

Water in tilted bottle is represented by a

0.___Random Scribble
1.___Line parallel to side or bottom of bottle
3.___Oblique line (not parallel to any lines of the model).
5.___Line parallel to table (within 5 degrees)

E. Vertical Orientation (based on tasks by Piaget and Inhelder, p. 379)

Ask child to draw the way a house would look om the steep slope (form A)

House, as represented is

0.___Inside mountain outline
1.___Likely to fall, being perpendicular to slope
2.___ " " " " vertical but without visible support
3.___ " " " " " " with doubtful support
4.___ Not " " " " " with probable support
5.___ Not " " " " " with visible support

© RAWLEY A. SILVER 1973 RYE, N.Y.